Exotic Pest Economics: Policy Principles and Trade Issues

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Agricultural Exotic Pest and Disease Issues are Important and Understudied

- Non-indigenous, invasive species harmful to agriculture => "exotic pests"
- Includes animal and plant diseases, weeds, insects, and other species
- Pest control is part of the infrastructure of agricultural production
- Significant, growing literature, but still under-studied, especially among academic economists
- WTO SPS rules emphasize the global nature of pest issues

Outline

1. Review application of public-good notions to agricultural exotic pests

2. Consider welfare impacts of actual policies and instruments… not enough to simply establish the public good nature of exotic pest exclusion

3. Implications for trade and trade policy

Exotic Pests as Public Bad and Border Measures and Eradication as Public Goods

- Two Criteria:
  - Non-rival in consumption
  - Non-excludable for non-payers
- Consider two broad exotic pest services:
  - Border measures to keep pests from entering
  - Eradication to eliminate pest that have entered

Services for Exotic Pests as Public Goods

- **May be "obvious", but economists have sometimes been too casual about declaring public goods or externalities (Coase, Cheung) and presuming public provision or subsidy must follow.**

- **Remember pest protection is private even though pest spread from farm to farm**

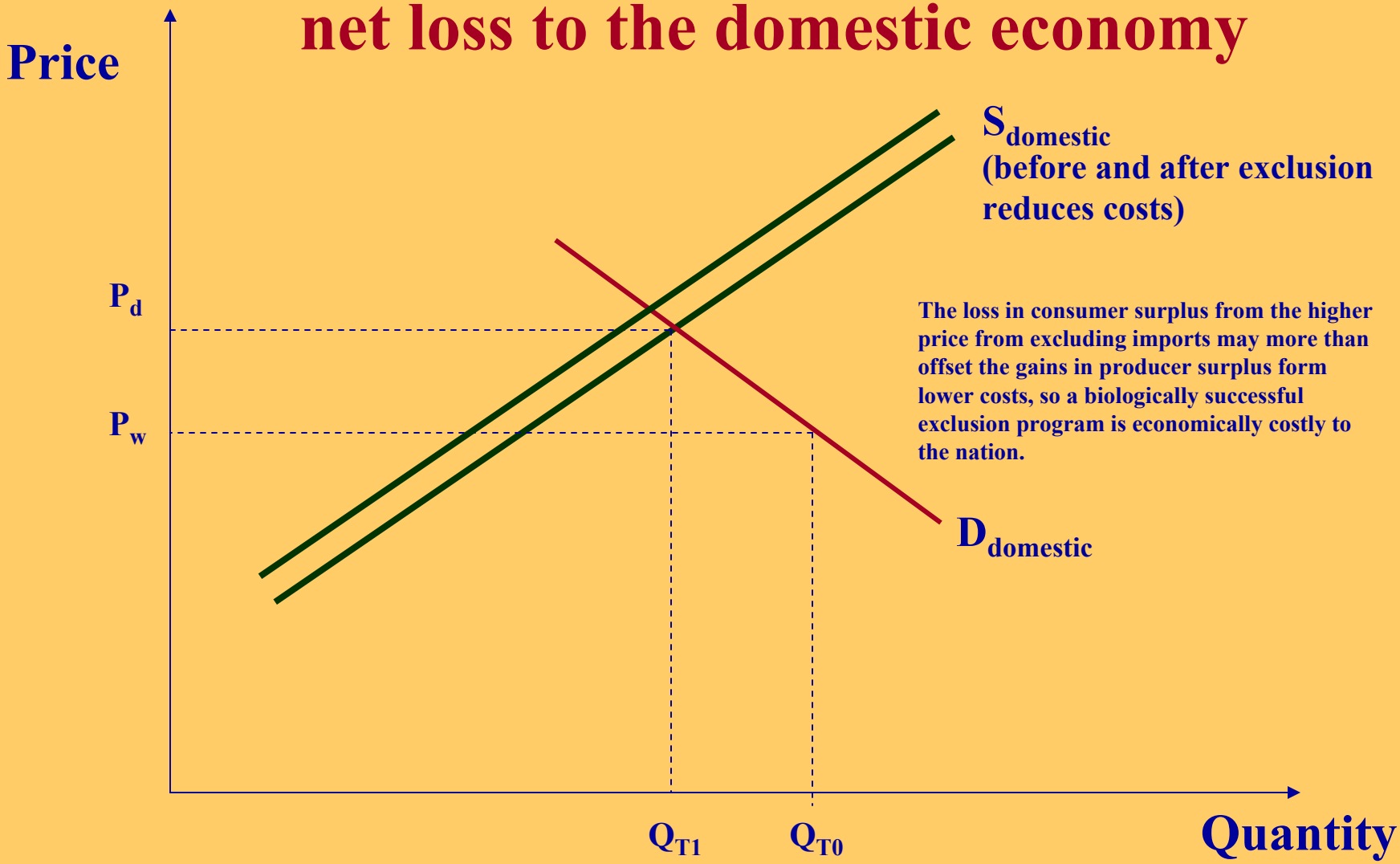
Non-Rivalry and Border Measures

- **Exclusion of a pest at the border saves internal pest control costs and may allow lower market price for consumers**
- **Within a natural pest region, border measures cost no more when "consumed" by more acres, farmers or commodity consumers**
- **Result hinges on definition of "region" in terms of pest habitat and spread and does not need to hold for political boundaries**

Excluding non-payers of border measures

- **Producers of host commodities in the "natural pest habitat" are not excludable from exclusion services**
- **Consumers must be defined in terms of commodities consumed from the protected region, not by location of consumer**
- **Of course governments control political borders for lots of other reasons, thus exclusion of pests may be a joint product with other exclusion border measures, but only if pest borders are political borders**

Exclusion may be biologically effective and a net loss to the domestic economy



Eradication issues

- **Benefits of eradication may also depend on trade relationships**
- **Embargos in other markets create incentives to eradicate**
- **Consider foot and mouth disease (FMD), citrus canker, and rice blast**

Eradication issues

- Same criteria, similar analysis
- Now costs may well depend significantly on extent of agricultural production that provides a habitat.
- Thus marginal cost of eradication rises with more "consumers" of the service
- Costs also depend on the biology of pest spread and when detection occurs; so monitoring becomes another policy instrument
- Industry assessment as partial funding source is natural

Public Good, Summary

- **Regions are defined by pests and hosts not political boundaries, but this is difficult**
  - **The US and Canada may be the same region for some pests**
  - **California and Texas may be in different regions for some pests**
- **Eradication costs may rise with more production of the commodity**
- **The public good users may be mainly the commodity consumers and producers, that is, the "public" may not be everyone and may include those outside the political boundary**

WTO Principles Apply to SPS

- **Most favored nation treatment**
  - **Members treated equally (except PTAs and "special" treatment for poor countries)**
- **National treatment**
  - **Treat imports and domestic goods equally**
- **Consultations for dispute**
  - **Offending action may continue with compensation in the form of new trade barriers**

Sanitary and Phytosanitary Measures

- **Use measures that are minimally trade restrictive**
- **Must use science based principles and evidence to establish pest threats**
- **Must use risk assessment to justify tighter standards**
- **Sub-national regions may be defined**

Sanitary and Phytosanitary Issues

- More access, with legitimate protection
- Phony trade barriers still hide behind legitimate concerns
- Big agricultural cases remain unresolved (biotech)
- Progress case by case through dispute settlement

Food and Mouth Disease

- Important issues and cases before the headlines about Britain
- Cleaned up in parts of Argentina and Uruguay, then disease returned
- Outbreaks in Taiwan and Korea
  - eradicated quickly, but at large cost
- Potential outbreak somewhere in the U.S.
  - How would the U.S. respond?

Food and Mouth Disease

- Argentina and Uruguay (A&U) worked many years to eliminate FMD in regions
- Productivity improves, but the major impact expected to be trade advantages
- Access to the high-priced "clean" market A&U competition has potential to lower beef prices (30%) with full access (Ekboir, et al. 2001)
- Competition mainly with Australia and NZ, but also U.S. directly
- U.S. has mixed incentives for helping clean up A&U
  - Keep pest from spreading north, but help a low cost competitor

Food and Mouth Disease

- SPS regionalization allowed for regions, but FMD is very contagious.
- Export markets and some other connections (tourists?) closed until cleanup
- Example: a California-wide outbreak costs $6.5 to $13.5 billion (Ekboir, et al. 2003)
  - Direct costs plus lost consumer and producer surplus… trade losses are a major part of this
  - Losses may be double industry gross revenue
- This large number includes animal kill and lost trade, but ignores tourists, wildlife etc.
- Emphasis on tight border measures, monitoring and rapid eradication if the pest entered

Citrus Canker

- Disease in Florida, but never in California
- If exclusion fails…eradicate or just live with it? (Jetter et al)
- Productivity losses and potential trade effects
- Eradication is a state activity with Federal help
- Consider effects in U.S. as a whole and within California
- California consumers could gain with an outbreak if others quarantine, other U.S. and foreign producers clearly gain

Eradication Compared to Establishment of Citrus Canker in California*

*High probability of success, significant infestation, long run supply elasticities, no embargo/quarantine because other regions have no hosts or already infested

	California Alone	All of U.S.
Eradication cost	**$78 million**	**$373 million**
Eradication benefits	**$493 million**	**$2,421 million**

Rice Blast Disease

- Disease is established and costly in most rice areas, but entered California just in 1996
- What are the costs? Eradicate or just live with it (Choi et al.)?
- Productivity losses, but no trade effects
- Parameters from biologist and supply and demand estimation
- Eradication … no, they just live with it!
- Private control undertaken at substantial cost
- Border measures protect against new strains that are more costly to control privately

Costs of Rice Blast Disease in California

Percentage change in					
Area	Quantity	Price	Revenue	$\hat{I}$ PS*	$\hat{I}$ CS*
-4.0	-6.0	3.0	-3.0	-5.6	-2.8

*as a % of total revenue

Supply elasticity 1.0, demand elasticity –2.0, 10% yield loss, medium private control

Public policy for dealing with introduction of rice blast

- **Cost to eradicate=> no prod. on 40% of area : price ↑20%, PS↓↑ $11mil. (cost estimate varies) CS↓$46mil.**
- **3 year loss $150 mil. Including direct costs of burning**
- **Benefits => avoid loss of PS and CS (8.4% of market revenue or . $23 mil per year. No trade losses…markets have blast**
- **Interest rate of 15% equalizes expected costs and expected present value of benefits (long horizon)…**

- **Why not eradicate? Not sure success, unsure of demand elasticity, how will foreign consumers pay, complex gov. subsidies, environmental concerns, institutional complexity of transfers among farms**

Overview observations on trade concerns and embargos or quarantines

- **FMD: Losses from infestation (incentives to eradicate) come largely from trade losses (regionalization is hard and whole U.S is affected)… maintain tight border measures**

- **Citrus Canker: Trade embargo is not a factor because other main markets are infested or have no hosts; eradication pays off because elimination area is likely to be small compared to industry size and costs of infestation is large… maintain border measures**

- **Rice Blast: No trade losses, but eradication unlikely because large area was infested quickly, questions about demand parameters and institutional complexity of distribution of benefits and costs…maintain some border measures**

Concluding Remarks

- **Exotic pest border measures and eradication can have public good characteristics**
  - **Within an sub-population of consumers and producers**
  - **Within a pest-defined not political boundary**
- **But, definition as a public good does not determine welfare maximizing policy**
- **SPS provisions may allow biology to dominate economic considerations in determining what is "WTO-legal" but this does not determine optimal policy**
- **Just because it is legal does not mean something is wise policy**

Concluding Remarks

- **Funding and acceptance are serious issues to maintain the needed infrastructure for biosecurity**
- **Additional "buy-in" requires border measures on pests are seen as driven by biology and economic interests and not linked to other international policy issues**
- **Additional use of assessments, or check-off funding to link costs and benefits for industry or commodity public goods**
- **Industry participation to operate and fund programs**
- **Requires a broad base including consumer interests together with economic analysis**

Concluding Remarks

- **Globalization, emphasis on opening agricultural markets and WTO/SPS rules reemphasize the importance of a strong support system to allow imports where safe, and document rationales for restrictions where warranted**
- **Economics must be a part of this system to assure the appropriate balance between openness and protection**